

This species is very nearly allied to the West Indian *Labrosomus pectinifer* and *L. capillatus* Sw., but differs from them in color and some minor details of form. The median tooth of the front of the vomer, which is so large in the *Labrosomus pectinifer*, is of the same size as the others in the *Labrosomus xanti*.

Old and young specimens were obtained by Mr. J. Xantus under rocks on Cerro Blanco. They are numbered 2334, 2335 and 2478 in the collection of the Smithsonian Institution.

I have dedicated this species to Mr. Xantus as a slight testimony to his worth and abilities: while engaged in his duties on the coast survey, and with many obstacles to contend against, on account of the present condition of affairs in Mexico, he has obtained a collection of terrestrial and marine animals, which is rich in new forms, and all the species of which are in the highest state of preservation.

5. *Labrosomus Herminieri* Gill.

Synonymy.

Blennius Herminieri Leseur, Journ. Acad. Nat. Sci. Pa., vol. iv. p. 361, 1825.

Clinus Herminieri Val., Hist. Nat. des Poissons, vol. xi. p.

This species appears to be nearly related to the other species of the genus, but is distinguished by the presence of only sixteen spines in the dorsal fin, and by a different pattern of coloration. The dorsal fin anteriorly has an elongate black spot. "The cheeks and head are rufous brown, vermicular with little blackish lines, which form an irregular kind of close net work."

The radial formula is as follows:

D 16, 11; A 20; P 16; V 3; C 14.

Specimens were taken at the West Indian Island of St. Bartholomews, in cavities of madreporic rocks, in the month of June, 1816, by C. A. Lesueur. It has not since been re-discovered.

Monograph of the Genus *LABRAX*, of Cuvier.

BY THEO. GILL.

There is found, in the Mediterranean sea, a fish which has, from the earliest times, attracted the attention of the inhabitants of the neighboring coasts from the abundance in which it is found and the size to which it attains. By the Ancients, as at the present day, it was much esteemed as an article of food, and was called by the Greeks *Λαβραξ* and by the Romans, *Lupus*. Of this fish, Cuvier has said that its appearance and almost all the details of its form recall to mind the *perch*, and that a just idea would be given of it by describing it as a "large, elongated and silvery perch."

From the *Perches*, however, it differs in several characters, which induced Cuvier to separate it generically, and for the name of the genus, he adopted the Greek designation of the species. The characters by which Cuvier distinguished it from the *Perches* were the presence of teeth on the tongue and of two spines to the operculum. It differs also from the true *Perches* in the armature of some of its bones, and by the shorter spinous dorsal fin, whose rays, in the European and allied American species, do not exceed the number of nine.

Though Cuvier was the first to properly distinguish the genus, its type had been long previously placed by Klein as the first of two species which he placed in a group, for which he used the same name of *Labrax*.

In the second and third volumes of the great "Histoire Naturelle des Poissons," Cuvier and Valenciennes have referred to the genus *Labrax* seven species, six of which are described in the former volume.

Of these, the *Labrax lupus* is the type of the genus, and is distinguished by

[April,

the spur-like spines of the inferior margin of the preoperculum; the presence of a perfect marginal band of teeth and of an oval basal patch on the tongue; three spines to the anal fin, and other characters which will be noticed in the diagnosis of the genus. To this should the name of *Labrax* be restricted.

The second species (le Bar alongé, or *Perca elongata* of Geoffroy) is distinguished by finer and more numerous teeth on the inferior border of the preoperculum, and the presence of only two anal spines. This is doubtless the type of a distinct genus to which the name of *Dicentrarchus* may be given.

The third species is the *Labrax lineatus* of Cuvier, the common rock fish and striped bass of the United States. This is now taken as the type of a very genus, for which Mitchell's name of *Roccus* is preserved. The characters are given below. To this genus should be also referred the *Labrax multilineatus* described by Cuvier and Valenciennes in the third volume of their "Histoire."

The fourth species, *Labrax Waigiensis*, has been identified by Bleeker with the *Psammoperca datnioides* of Richardson; if this is correct,—and notwithstanding the discrepancies between the descriptions of the "Histoire Naturelle" and Richardson, such appears to be the case—it belongs to a very distinct genus from *Labrax lupus*. The teeth of the jaws, vomer and palatines are described by Richardson as crowded, rounded and granular, while by Cuvier the teeth on both jaws, the chevron of the vomer and the palatines are said to be villiform ("dents en velours"); it is also stated by Cuvier that there is a small oval disc at the base of the tongue. By Richardson, the tongue is said to be smooth. In the latter statement, however, he disagrees not only with Cuvier and Valenciennes, but with Bleeker, who also asserts* that there is an oblong patch at the base of the tongue; "lingua basi thurma denticulorum scabra." Both authors agree as to the presence of a single spine to the operculum (although one of the generic characters assigned to *Labrax* by Cuvier is the presence of two spines on that bone), and of a strong horizontal spine at the angle of the preoperculum, above which the margin is pectinated.

The next species in order,—*Labrax Japonicus* of Cuv. and Val.,—is the type of the genus *LATEOLABRAX* of Bleeker, which is widely separated from *Labrax* by the absence of any teeth on the tongue. In the plectroid armature of the operculum it, however, resembles that genus.

The last species—*Labrax mucronatus*—is now taken as the type of a new genus, for which the name of *MORONE* is accepted. Its generic characters and affinities will be given at length in a subsequent portion of this memoir.

Of the seven species referred by Cuvier and Valenciennes to the genus *Labrax*, six are thus seen to belong to different genera. Nor do any of these genera appear to be unnecessary, but on the contrary, all of them are well distinguished from each other by characters that ichthyologists must admit are of importance; two of the species, indeed, that were referred to the genus by the French naturalists, do not agree with their characters of that genus. It is not in disparagement of those celebrated and able men that these remarks have been made. The progress of scientific discovery and the examination of better materials have enabled their successors to discover the errors of the founders of modern ichthyology. None could have performed the work at that day better than they.

Having long since, from an examination of the descriptions of various authors, been aware of the confusion and uncertainty in which our American species of the Cuvieran *Labrax* were enveloped, I have thought that it might be a useful task to attempt the elucidation of the genus. More than three years ago, I had noticed that the *Labrax rufus* of *Dekay* belonged to a different natural genus from *Labrax*, but not having then had an opportunity of examining the European species, I believed that the *Labrax lineatus* was a true *Labrax*. The name which I had then applied to the *Labrax rufus* having never been published, I have now renounced it for that of Mitchell, not because

* Natuurkundig Tydschrift voor Nederlandsch Indie, vol. ii. p. 479.

he was the author of the genus, but because the name had been applied, though from a false idea, to one of its species.

The number of American species admitted by Drs. Dekay and Storer in the genus *Labrax* amounts to seven, and another specific name has been since added by Filippi, an Italian naturalist. It will be attempted to demonstrate, in the following monograph, that all of these nominal species are referable to three true ones. Three of the synonyms apply to one species and four to another.

Besides the species that have been attributed to the genus by Richardson, Dekay and Filippi, several others have been described under that name by modern naturalists. Dr. Charles Girard has noticed two of these in the "Proceedings of the Academy of Natural Sciences of Philadelphia," under the name of *Labrax nebulosus* and *L. clathratus*. He afterwards constructed for them a new genus which he called *Paralabrax*, and placed it in the vicinity of *Serranus*. They appear truly to belong there, or perhaps to the group composed of *Elastoma* Sw., or *Macrops* Dumeril, and *Etelis* Cuv.

Mr. Hill, of Jamaica, in a useful catalogue of the Fishes of that island, has also noticed a fish which he referred to *Labrax*, under the name of *L. pluvialis*, or the rainy weather chub. It is said by that gentleman to be confounded by the fishermen with the *Labrax mucronatus*, but differs from it by the presence of vertical bars, like those of the common perch of Europe and America. Is not this related to the *Perca Plumieri* of Cuvier and Valenciennes? The presence of the vertical bars would militate against its natural association with *Morone*, and it may perhaps be the type of a distinct genus or belong to the genus *Percichthys* of Girard.

For the facilities of investigating into the history of this group I am indebted to the Museum of the Smithsonian Institution.

I. LABRAX (Klein) Cuv. emend.

Synonymy.

Labrax Klein, Miss. V. p. 25, 1749.

Perca sp. Linn. auct.

Sciæna sp. Bloch.

Centropome sp. Lac.

Perseus sp. Lac.

Labrax sp. Cuv. Regne Animal, ed. prima, vol. ii. 1817.

Dentes maxillares, palatini et vomerini velutini; dentes linguales velutini in margine totio et fascia longitudinali mediana dispositi. Squamæ occipitales et interorbitales, et in genis pleurusque cycloideæ vel vix pectinatæ. Preoperculum postice serratum vel pectinatum, ad angulum plerumque subtusque spinis recurvatis antrorsum spectantibus. Operculum biaculeatum. Pinnae dorsales ad basin haud membrana elevata conjunctæ; pinna dorsalis prima numero radiorum haud decem superante. Pinna analis spinis tribus in magnitudine regulariter increscentibus.

The genus *Labrax*, as above restricted, is chiefly distinguished by the continuous band of villiform teeth around the margin of the tongue, and the oval disc at its base. It is most intimately allied to the genus *Roccus*, from which it is separated by the character of the lingual dentition and the plectroid inferior margin of the preoperculum; the latter character is seen in the less nearly allied genus, *Lateolabrax* of Bleeker.

But a single species of this genus is yet known.

Labrax diacanthus Gill.

Synonymy (partim.)

Perca labrax Linn. Systema Naturæ.

Sciæna diacantha Bloch.

The full synonymy of this species can be ascertained by reference to the

[April,

"Fauna Italica" of the Prince of Canino; as it has been given by Cuvier as well as Canino, it is not necessary to more than refer to it here.

As many names had been given to the species before it was designated *Labrax lupus* by *Cuvier*, that name cannot be retained if we are to be guided by the rules of priority. A specific name given to it by Bloch is therefore adopted.

In the edition of the "Systema Naturæ" by Gmelin, the European *Labrax* appears under the name of *Perca punctata*. Cuvier and Valenciennes have shown that this name is only a misapplication of one by Linnæus, who had given it to a Scienoid from North America, which he placed immediately before the *Perca labrax* in his System. Gmelin, in his edition of the same work, has by mistake omitted both the description of the Linnæan *Perca punctata* and the name of *Perca labrax*, so that the name of the former is there applied to the description of the latter. Bloch has also applied the name of *Perca punctata* to the young of *Labrax diacanthus*, but without allusion to the names of Linnæus or Gmelin. As the name thus applied would have at that time conflicted with the one of Linnæus, it should not be retained. The name of *Sciæna diacantha* coming next in order, its specific part must be adopted. Although the name of *Lupus* was bestowed on this species by the ancient Romans, that does not appear to constitute a valid reason for accepting it as a scientific name.

II. DICENTRARCHUS Gill.

Synonymy.

Perca sp. Geoffrey.

Labrax sp. Cuv. et Val.

Genus *Labrici* Cuv. simile, sed preoperculo margine inferiore dentibus non validis, et pinna analis solum spinis duabus.

Dicentrarchus elongatus Gill.

Synonymy.

Le Bar alongé Cuv. and Val., Hist. Nat. des Poissons, vol. ii. p. 79.

This species I have never seen, but it evidently belongs to a distinct genus, and I have been, in a measure, compelled to give it a name in order to present a perfect view of the classification of the *Labraces*.

The species is an inhabitant of the Mediterranean sea.

The synonymy of the species is given in the second volume of the "Histoire Naturelle des Poissons," to which reference is made.

III. ROCCUS (Mitch.) Gill.

Synonymy.

Sciæna sp. Bloch.

Perca sp. Bloch, Schneid., Mitchell, 1818.

Centropome sp. Lac.

Roccus sp. Mitchell, Report in part on the Fishes of New York, p. 25, 1814.

Lepibema Raf. Ichthyologia Ohiensis, p. 23, 1820.

Labrax sp. Cuv., et Val.

Corpus gracile vel oblongo-ovatum, dorso antice curvato. Dentes maxillares, palatini et vomerini velutini; dentes linguales velutini, in fasciis lateralibus et ad basin in seriebus duabus longitudinalibus separatis vel coalescentibus dispositi. Squamæ a nucha ad nares et in genis plerumque cycloideæ. Preoperculum postice subtusque pectinatum, operculum biaculeatum. Pinna dorsales ad basin non membrana elevata conjunctæ. Pinna dorsalis prima numero radiorum non decem superante. Pinna analis spinis tribus in magnitudine regulariter increscentibus. Linea lateralis rectilinearis.

1860.]

The genus *Roccus* is very closely allied to both *Labrax*, as here revised, and *Morone*. From *Labrax* it differs chiefly in the character of the armature of the preoperculum, and by the absence of the teeth at the anterior extremity of the tongue; the whole margin of the tongue in the latter genus being provided with a band of villiform teeth, and the spur-formed teeth of the inferior margin of the preoperculum calling to mind the genus *Plectropoma* of Cuvier among the *Serrani*. The difference between the last named genus—or at least of many of its species—and *Serranus* is indeed not of as great value as that between *Labrax* and *Roccus*. The only constant character between *Serranus* and *Plectropoma*, as those genera were established by Cuvier, is the spur-like dentition of the inferior border of the preoperculum, while *Labrax* and *Roccus* are distinguished not only by an equally great and constant difference of the preopercular border, but also by the difference of the lingual dentition. As the former character is of as great value in the Labraces as in the *Serrani*, consistency will require that if *Plectropoma* and *Serranus* are considered as distinct genera, *Roccus* and *Labrax* should also be so regarded.

The difference between *Roccus* and *Morone* is of even more importance than that of *Roccus* and *Labrax*. The distinguishing characters will be referred to under the diagnosis of *Morone*.

The name which has been adopted for this genus is one given by Dr. Mitchell, in the year 1814, to a medley comprising the *Roccus lineatus*, which he called *Roccus striatus*, and the *Otolithus regalis*, which was designated as *Roccus comes*. The name was solely the result of ignorance on the part of the author, of the application of the ordinary terms used by naturalists at that day. The name itself is a barbarous latinization of the popular name, rock fish, by which its chief species is known in many parts of the United States. Notwithstanding these facts, it has been nevertheless deemed more advisable to accept the name than to apply a new one. It is scarcely worse than *Rattus*, *Kangurus*, *Catus*, *Gunnellus*, and many other names of similar derivation.

Rafinesque, in the "*Ichthyologia Ohiensis*," also proposed for his *Perca chrysops*, in case it should be found to be generically distinct from *Perca*, the name of *Lepibema*. He believed it to be distinguished "by the scaly bases of the caudal, anal and second dorsal fins, the last with some spiny rays, and all the three parts of the gill cover more or less serrulate, besides the small teeth." Rafinesque suggested that to this genus the *Perca Mitchelli* of Mitchell might "perhaps be found to belong."

The genus *Roccus* may be divided into two sections.

§ I. Corpus elongatum; dentes ad linguæ basin in seriebus longitudinalibus duabus ordinati.

Roccus lineatus Gill.

Synonymy.

Sciæna lineata Bloch, *Ichthyologie*, pars. ix. p. 53, pl. 305.

Perca ——— Schoepff, *Schrift. der Gesells. Nat. Freund*, vol. viii. p. 160.

Perca saxatilis Bloch, *Systema Ichthyologiæ*, Schneid. ed. p. 89.

Perca septentrionalis Bloch, *Systema Ichthyologiæ*, Schneid. ed. p. 90, pl. 70.

Centropome rayé Lac., *Hist. Nat. des Poissons*, vol. iv. p. 225.

Roccus striatus Mitchell, Report in part on the fishes of New York, p. 25, 1814.

Perca Mitchelli Mitchell, *Trans. Lit. and Phil. Soc., N. Y.*, vol. i. p. 413, pl. 3 fig. 4.

Rock-Fish Mease, *Trans. Lit. and Phil. Soc., N. Y.*, vol. i. p. 502.

Perca Mitchelli } *Raf. Ichthyologia Ohiensis*, p. 23, (passim).

Lepibema Mitchelli }

Labrax lineatus Cuv. et Val., *Hist. Nat. des Poissons*, vol. ii. p. 79.

Perca labrax! Smith, *Nat. Hist. Fishes of Mass.*, p. 277.

[April,

- Labrax lineatus* Rich., Fauna Boreali-Americana, vol. iii. p. 10.
 “ “ Storer, Report on the Fishes of Mass., p. 7.
 “ “ Ayres, Boston Journ. Nat. Hist., vol. iv. p. 757.
 “ “ Dekay, Zoology of New York, Fishes, p. 7, pl. 1. fig. 3.
 “ “ Linsley, Catalogue of Fishes of Connecticut.
 “ “ Storer, Synopsis Fishes of N. America, p. 21, ib. in Memoirs
 Am. Acad.
 “ “ Storer, Hist. Fishes of Mass., ib. in Memoirs Am. Acad., vol.
 v. p. 55, pl. 1, fig. 4., 1853.
 “ “ Baird, Report on Fishes of New Jersey coast, p. ib. in Ninth
 Annual Report of Smith. Inst., p. 321.
 “ “ Holbrook, Ichthyology of South Carolina, p. 17, pl. iv. fig. 2.
 “ “ Gill, Annual Report Smith. Inst., 1857, p. 255.

This species is so well known and has been so frequently described and figured that no description is here needed. The best that has appeared is that of Holbrook in the Ichthyology of South Carolina; in that, the only correct account of the lingual dentition published by any American author, is given. The best illustration of the species is given by Sonrel in Dr. Storer's "History of the Fishes of Massachusetts," and is superior to that of Dr. Holbrook.

Cuvier and Valenciennes have described the tongue as having asperities only on its sides, while other naturalists have stated that the teeth on the tongue are most obvious on its sides," or more correctly that the "tongue is rough at its base and upon its sides and smooth in the centre." Dr. Holbrook has well said that "there are two bands of minute teeth, at the root of the tongue, separated slightly from each other in the mesial line; the sides of the tongue are also armed with small teeth."

Prof. Filippi, a learned naturalist of Turin, has also correctly described the lingual dentition of *Roccus lineatus* in comparison with a species of the genus which he regarded as new, but which has, in this monograph, been considered as identical with the *Roccus chrysops*.

§ II. Corpus oblongo-ovatum, compressum; dentes ad linguæ basin in turma ovali aggregati.

Roccus chrysops Gill.

Synonymy.

- Perca chrysops* } Raf., Ichthyologia Ohicensis, p. 28.
Lepibema chrysops }
Labrax multilineatus Cuv. and Val., His. Nat. des Poissons, vol. iii. p. 588.
Perca multilineata Les. fide Cuv. and Val.
Labrax notatus Smith, in Rich. Fauna Boreali-Americana, vol. iii. p. 8, 1836.
Labrax multilineatus Kirtland, Boston Journal Nat. Hist., vol. v. p. 21, pl. 7,
 fig. 1.
 “ “ Dekay, Nat. Hist. of New York Fishes, p. 14.
Labrax albidus Dekay, Nat. Hist. of New York Fishes, p. 13, pl. 51, fig. 165.
Labrax notatus Dekay, loc. cit., p. 14.
Labrax multilineatus Storer, Synopsis of the Fishes of North America, p. 22,
 ib. in Memoirs of American Acad.
Labrax notatus Storer, loc. cit., p. 22.
Labrax albidus Storer, loc. cit., p. 23.
Labrax osculatii Filippi, Revue et Magazin de Zoologie, 2d series, vol. v. p. 164.
Labrax chrysops Gill, Proc. Acad. Nat. Sci., Phila., 1860, p. 20.
 Non *Labrax chrysops* Girard.

The *Roccus chrysops* of this monograph is undoubtedly identical with the *Perca* or *Lepibema chrysops* of *Rafinesque*, and the *Labrax multilineatus* of the "Histoire Naturelle des Poissons" and of Kirtland. The descriptions that have been yet given of the species under those names are meagre and unsatisfactory, but the notice of the color given by the above 1860.]

named authors and the possession of specimens from the same hydrographical basins as those from whence the fishes described by them were taken, leave no doubt as to the identity of the species.

Rafinesque's description of his *Perca chrysops* is, like almost all his descriptions, inapplicable to any known fish, but it agrees with the *Morone chrysops* better than any other species. Rafinesque erroneously attributes to his species six branchiostegal rays, a single opercular spine, eight spines to the first dorsal fin, and places it under the genus *Perca*, all the species of which, he informs us, have naked heads. He proposed for it a new genus to which he gave the name *Lepibema*, in allusion to the scaly bases of the unpaired fins.

Lesueur subsequently sent to the Parisian Museum two specimens of a species which he called *Perca multilineata*, which Cuvier and Valenciennes placed in their genus *Labrax*, but adopted for it the specific name of Lesueur. Their description is mostly comparative, it being said to differ from the *Labrax lineatus* by its higher body, shorter head, more feeble teeth, the stronger asperities of the tongue, and especially the larger scales of the maxillaries, which resemble those of *Labrax mucronatus*, while in *Labrax lineatus* they were said to be scarcely perceptible.

The description of the lingual dentition is very unsatisfactory, and no correction is made of the statement made in the second volume that the *Labrax lineatus* has only lateral teeth. It is not in the development of the asperities of the tongue that the lingual dentition of the species differs, but that while there are two narrow rows separated by a mesial line in *Roccus lineatus*, the rows are broader at the middle, in proportion, and coalescent in *Roccus chrysops*.

There were said to be in one specimen sixteen, and in another, nineteen longitudinal dark lines. So large a number is rarely seen; the most constant arrangement is five above, including the one through which the lateral line runs, while sometimes there are several below the lateral line, and at other times they are obsolete. These lines are sometimes straight, but often interrupted.

In the "Fauna Boreali-Americana" of Richardson, a *Labrax* is described in the volume on Ichthyology, under the name of *Labrax notatus* (Smith), the Bar-fish or Canadian Basse. This species is said to "differ from Mitchell's Basse (*L. lineatus* Cuv.) in being much more robust, and in being marked with rows of spots, five above and five below the lateral line, so regularly interrupted and transposed as to appear like ancient church music." It has been suggested by Dr. Dekay that it is the same as the *Perca Mitchelli*, var. *interruptus* of Mitchell, but the comparison will apply very well to *Roccus chrysops*, and it is doubtless identical with that species. In the remarks upon the species, it is said—by Dr. Richardson apparently—that "in the more robust form, and in the strong scales of the head, the Canadian Bar-fish resembles the *L. mucronatus* of the United States and the West Indies, and the *L. multilineatus* of the Wabash. The latter has sixteen narrow, black, longitudinal lines on the flanks." It has been attempted to show that the number of lines is not a specific character, and if this is the case, the *Labrax notatus* and *L. multilineatus* are probably identical with each other and with *Roccus chrysops*. The *Labrax notatus*, it is true, is stated by Smith to have but one anal spine and six articulated ventral rays, but this statement is undoubtedly due to a *lapsus calami* or an error of observation. So great a variation, in the number of anal spines, from a nearly allied species, would be in direct opposition to all we know of the peculiarities of the fishes of this tribe, while it is one of the characters of the family to have only five branched rays in the ventral fins. Smith states that he counted fifty-eight scales along the lateral line, a statement which confirms the identity of this species with *Roccus chrysops*.

In the abstracts of Smith's description of *Labrax notatus*, given by Dekay [April,

and Storer, the species is said to have the "length, one to two feet." If this was so, it might militate against the idea of its identity with *Roccus chrysops*, but an examination of the description of Smith and Richardson reveals no mention whatever of the size of the species.

In the number of Guerin's "Revue et Magazin de Zoologie," for April, 1853, (vol. v. p. 164,) Professor Filippi, of Turin, has described a *Roccus* to which he has given the name of *Labrax Osculatii*, a traveller in America, M. Osculati, having obtained it from Lake Ontario. Filippi has distinguished this species from *Labrax lineatus* very well, alluding to the two longitudinal lines of basal teeth in that species, and attributing to his own a single oval patch. His other characters are the greater height of the body in *L. Osculatii*, which equals a third of the length, while in *L. lineatus* it is a

quarter; and the number of scales, which are formulated as 56 — for *L. Osculatii*, and 64 — for *L. lineatus*. The true teeth are also said to

be more numerous. The distinctive characters of the species are very well stated by Filippi, but his expression of surprise that a fish so common in the United States should not have been noticed by any American naturalist, not even by Dr. Dekay, is uncalled for. Unhappily, the species had been too often noticed, and in Dekay's Ichthyology of New York it appears under no less than three different names. Filippi has mentioned its habitat as the sea and rivers of the United States (*Mare et fluviis confederationis Americanæ*). I know not on what authority it is said to inhabit the sea; it is probably assumed to be found there because the *Roccus lineatus* is. So far as we now know, it is confined to the great fresh water lakes and the Western rivers.

Specimens of the *Roccus chrysops* are in the Museum of the Smithsonian Institution, from southern Illinois, obtained by Mr. Robert Kennicott, and from the Root river at Racine, Wisconsin, Toronto, &c., obtained by Professor Baird.

The specimens from the hydrographical basins of the Ohio river and of the Great Lakes cannot be specifically distinguished from each other. Nor can I perceive the difference signalized by Dr. Kirtland in the caudal fins of Ohio and Lake Erie specimens.

In extreme youth, this species appears to be crossed by obscure vertical bands; at a later epoch these bands are lost, and afterwards the longitudinal lines are assumed.

The best descriptions of this species have been published by Prof. Filippi under the name of *Labrax Osculatii*, and by the late Dr. Dekay under that of *Labrax albidus*. The best figure is that given by Dr. Kirtland in the Journal of the Boston Society of Natural History, but the dorsals are erroneously represented as being connected by a low membrane. In the text they are correctly described as being "distinct."

IV. MORONE. (Mitch.) Gill.

Synonymy.

Perca sp., Bloch, Gmel. Lac.

Morone sp., Mitchell.

Bodianus sp., Mitchell.

Labrax sp., Raf.

Corpus oblongo-ovatum, gibbosum ad pinnae dorsalis initium. Dentes maxillares, palatini et vomerini velutini; dentes linguales in margine totio dispositi, ad basin carentes. Squamæ in capite totio bene pectinatæ. Preoperculum postice subtusque pectinatum. Operculum biaculeatum. Pinnae dorsales ad basin membrana paulo elevata conjunctæ; pinna dorsalis spinosa radiis numero non decem superantibus. Pinna analis spinis tribus, quarum secunda sæpe major est. Linea lateralis antice convexa vix dorso concurrens.

1860.]

The chief distinctive characters of the genus are the presence of strongly pectinated scales on the cheeks and opercular bones, and the band of villiform teeth on the sides and of more scattered ones at the tip.

In the armature of the preoperculum and operculum, it resembles the genus *Roccus*. In the connection of the dorsal fins at the base, the less allied Pacific genera *Lateolabrax* of Bleeker, and *Psammoperca* of Richardson. The slightly gibbous back in front of the dorsal fin, and the greater developement of the second anal spine are secondary features, which support the natural characters of *Morone* as distinguished from the genus *Roccus*.

For the name of the genus, one used by Mitchell for a group founded in error, has been adopted. The name of Mitchell resulted from a misunderstanding of that author regarding the value of the terms made use of by Linnaeus. The genus *Perca* was placed by the Swedish naturalist in his section of *Thoracici*; Mitchell, believing that the *Morone americana*, *Perca flavescens* and *Pomotis maculatus* were rather abdominal fishes, considered them to be generically distinct from *Perca*, and consequently gave to them the generic name of *Morone*. It is scarcely necessary to state that all the species enumerated have the normal position of the ventrals of *Perca*, and that therefore *Morone* of Mitchell was a mere synonyme of *Perca* of Linnaeus. I have nevertheless preferred to take that name rather than to give a new one.

Morone americana. Gill.

α.

Synonymy.

Perca Schoepff, Schrift. der Gesells. Nat. Freund, vol. viii. p. 159.

Perca americana Gmel., Systema Naturæ, vol. i., pars iii., p. 1308.

Perca Schoepff, Naturforscher, vol. xx., p. 17.

Perca americana Bloch, Systemæ Ichthyologiæ, Schneid. ed.

Perca americana Lac., Hist. Nat. des Poissons, vol. iv. p. 412.

Morone rufa Mitchell, Report in part on the Fishes of New York, p. 18.

Bodianus rufus Mitchell, Trans. Lit. and Phil. Soc. of New York, vol. i. p. 420, Jan. 1814.

Centropomus albus Raf. Precis des decouvertes Somilologiques, June, 1814. p. 19.

Perca mucronata Raf., American Monthly Magazine and Critical Review, vol. ii. p. 205.

Labrax mucronatus Cuv. and Val. Le petit Bar d'Amerique, Hist. Nat. des Poissons, vol. ii., p. 81, pl. 121.

Bodianus rufus Smith, Nat. Hist. Fishes of Mass, p. 274.

Labrax mucronatus Storer, Report on Ichthyology of Mass., p. 8.

Perca macronatus (misprint) Sw. Nat. Hist. of Fishes, Amphibians and Reptiles, vol. ii., p. 198. 1839.

Labrax rufus Dekay, Nat. Hist. of New York Fishes, p. 9, pl. 3, fig. 7.

Labrax mucronatus Ayres, Boston Journal Nat. Hist., vol. iv., p. 257.

Labrax mucronatus Linsley, Catalogue of Fishes of Connecticut.

Labrax rufus Storer, Synopsis of the Fishes of North America, p. 22; ib. in Memoirs of American Acad., new series, vol. ii., p. 274. 1846.

Labrax rufus Storer, Hist. of the Fishes of Mass., p. 1, ib. in Memoirs of American Acad., n. s., vol. v., p. 57.

Labrax mucronatus Baird, Report on Fishes of New Jersey Coast, p. 8; ib. in Ninth Annual Report of Smith. Inst. p. 322. 1855.

Labrax americanus Holbrook, Ichthyology of South Carolina, p. 21, pl. 3, fig. 2. 1855.

Labrax rufus Gill, Annual Report of Smith. Inst., p. 256. 1857.

Labrax mucronatus Hill, Catalogue of Fish of Jamaica, p. 1.

β.

Labrax nigricans Dekay, Nat. Hist. of New York Fishes, p. 12, pl. 50, fig. 160. 1842.

[April,

Labrax nigricans Storer, Synopsis of the Fishes of North America; ib. in Memoirs of American Acad., vol. ii. p. 23. 1846.

γ.

Morone pallida Mitchell, Report in part on the Fishes of New York, p. 18.

Bodianus pallidus Mitchell, Trans. Lit. and Phil. Soc. of New York, vol. i. p. 420.

Bodianus pallidus Smith, Nat. Hist. of Fishes of Mass. p. 294.

Labrax pallidus Dekay, Nat. Hist. of New York, Fishes, p. 11, pl. 1, fig. 2. 1842.

Labrax pallidus Storer, Synopsis of the Fishes of North America, p. 22; ib. in Memoirs of American Acad., vol. ii., p. 22.

Labrax pallidus Perley, Report upon the Fishes of the Bay of Fundy, p. 121. 1851.

Labrax pallidus Perley, Descriptive Catalogue (in part,) of Fishes of New Brunswick and Nova Scotia, p. 4; ib. in Reports on Sea and River Fisheries of New Brunswick, p. 182. 1852.

In the above synonymy, it will be observed that several species which have been created as distinct, and so retained by succeeding naturalists, have been merged into one. Although there can scarcely be a doubt of the identity of these nominal species, the synonymy, at the same time, has been divided into three portions, each applying to one of the nominal species as previously accepted.

The reference of all the variations of the *Labrax americanus* type to one species has been only done after a careful study of Dekay's descriptions, and after examination of numerous specimens of the genus. The descriptions of Dekay certainly do not afford any means for distinguishing his species, in the case of *Labrax rufus* and *Labrax nigricans*, except a very slight difference in the shade of color. The description of the color of the latter species is given by Dekay, as follows:

"The general hue is deep brownish-black, more intense on the head and upper part of the body. In the older specimens, there is a strong brassy hue throughout; occasionally dark longitudinal parallel streaks on the upper part of the body, pupils black, irides yellow, base of the fins light greenish-yellow, edge of the membrane of the spinous dorsal, black; upper portion of the membrane of the posterior dorsal fin transparent, and separated from the yellow portion at the base by a tolerably well defined dark band; membrane of the anal fin dark toward the tips of the rays."

Let any naturalist take an ordinary specimen of the common white perch, and decide whether the difference of color between that specimen and the *Labrax nigricans* is sufficient to authorize a separation on that ground; in all other respects, the description of Dr. Dekay will exactly apply to his *Labrax rufus*.

The distribution of the darker shades of color on the body and fins, is the same in both species; the proportions are the same, and the difference in the number of rays is not greater than is noticed in the same species. Is it not probable that Dr. Dekay was induced to separate the *Labrax nigricans* from his other species on account of a supposed difference of station? The *Labrax rufus* is described as being "obtained in brackish streams," while the *Labrax nigricans* is said to be found in "deep fresh-water ponds in Queen and Suffolk Counties." But the true *Labrax rufus* (*Morone americana*) is found also in streams of fresh water, and in ponds that are now entirely disconnected from the salt water, although not far from the sea. As there is therefore no difference in the habitation of the supposed two species, and as no specific distinctions appear to exist from the descriptions of Dr. Dekay, no alternative is left but to consider them identical.

Mr. William H. Herbert, a popular writer on our fishes, entertained "great doubts" whether the *Labrax nigricans* was more "than a casual variety of 1860.]

the Black Bass of the Saint Lawrence," the "*Grystes nigricans* of Agassiz." Such doubts deserve no consideration, as there are none of its being at least the congener of *Morone americana*.

As to the *Labrax pallidus*, there is a greater discrepancy in the description of it as compared with that of the *Labrax rufus*. It is said that in the former, the opercle has "a single flat spine, and a pointed membrane extending beyond it," while the generic characters given by Cuvier to the genus are retained, one of which is founded upon the presence of "two points on the opercle." The statement that *Labrax pallidus* has but one spine is probably due to a misapprehension of Dekay. In the *Morone americana* there is one acute point terminating the opercle, above which is an emargination separating it from a more obtuse or rounded process, which in one case has been regarded as a spine, and in the other has not. It is impossible to believe that two fishes of this genus so nearly resembling each other, should so differ in the development of the opercular spines.

Another distinctive character is said to exist in the first ray of the posterior dorsal, which is "nearly as long as the second." Was not this relative difference in the proportions of the rays the result of injury to the tips of the succeeding soft ones? As a third character, it is mentioned that the body is "much compressed." From the figures of *Labrax rufus* and *Labrax pallidus*, it would appear that any difference in height was rather in favor of the former than of the latter. No mention is made in the description, of the color of the fins of *Labrax pallidus*, but from the figure it would appear that the pattern is nearly the same in that species as in *Labrax rufus*, but the shade is lighter towards the borders of the dorsal and anal. This difference is too trivial to be accepted as specific, and if the above conjectures as to the nature of Dr. Dekay's statements are correct, the *Labrax pallidus* must be regarded as a mere synonyme of *Morone americana*.

Morone interrupta Gill.

Synonymy.

Labrax chrysops Girard. General Report upon the Zoology of the several Pacific Railroad routes, Ichthyology, p. 29.

non *Roccus chrysops* Gill.

The form of this species scarcely differs from the *Morone americana*, the chief difference existing in the more gradual declination of the dorsal outline to the end of the second dorsal fin, and the greater inequality of the anterior and posterior portions of the caudal peduncle. The greatest height of the body equals three-tenths of the length from the snout to the concave margin of the caudal fin; of that length, the head forms almost three-tenths, being not much less than the height of the body, and the caudal fin, at its middle rays, equals half of the height of the body. The caudal fin, when expanded, is emarginated and its angles rounded; the shortest rays equal three-fifths of the length of the longest.

The dorsal fin commences at a vertical intermediate between the bases of the pectoral and ventral fins, and is of a triangular form, the fourth ray being the largest, and equalling the length of the pectoral fin; the spines have the same form and arrangement as those of *Morone americana*. The second dorsal is connected by a membrane as in *Morone americana*; its spinous or first ray is little more than half the length of the first articulated one, which itself is nearly as long as the fourth dorsal spine; the fin thence decreases in height towards its last ray, which is shorter than its spinous one.

The anal fin commences under the fourth or fifth articulated ray of the second dorsal, and about four of its rays are posterior to the termination of that fin; the first spine is short and robust; the second at least twice as long as the first, compressed, and very strong; the third is as long or longer than the second, but much more slender. The first articulated ray of the anal is

[April,

longer than the spines, and about twice as long as the last; the outline of the fin is slightly emarginated.

The first ray of the pectoral fin is, as usual, articulated but simple; the third is longest and branched, and equals the base of the second dorsal.

The ventrals are about as long as the pectorals; the length of the spine is equal to two-thirds of that of the first or second branched rays.

The radial formula is as follows:

Dix—I, 12; A iii, 10; C 4, I, 8, 7, I, 2; P 3, 14; V i, 5.

The scales are of about the same size as in the *Morone americana*, the lateral line running through about fifty, besides the smaller ones at the base of the caudal fin; at the region of its greatest height, there are about nineteen rows, of which about seven are above the lateral line and eleven beneath. The relative proportions on the different parts of the body are almost nearly the same as in that species, the chief difference existing on the front of the back, where the exposed portions of the disc are higher and narrower than in *M. americana*. On the cheeks from the orbit to the angles, there are about seven oblique rows.

The specimens preserved in spirits have a bright brazen color, tinged on the back with olivaceous. Along the sides are seven very distinct longitudinal black bands, through the fourth of which the lateral line runs for its entire length. The continuity of the bands below the lateral line is interrupted at the posterior half of their length, and they there alternate with their anterior parts.

The dorsal fins are tinged with purple, and the margin of the spinous one is dark. The anal is of a darker purple towards its anterior angle. The caudal, especially posteriorly and at its middle, is purple. The rays of the pectoral and ventral fins are yellowish, while the membrane of the former is hyaline, and of the latter sometimes minutely dotted.

This species, as will be observed by reference to the synonymy, has been described by Dr. Charles Girard, under the name of *Labrax chrysops* Grd. (Perca or *Lepibema chrysops* Raf.), to which is also referred as a synonyme, the *Labrax multilineatus* of Cuvier and Valenciennes, Kirtland, Dekay and Storer. From that species, it is very distinct, and even belongs to a different genus. Cuvier described the ground color as a greenish-gray on the back and silvery on the belly. This is not the color of *Morone interrupta*, and that species must be therefore distinct from *Labrax multilineatus*, nor can it be the *Perca chrysops* of Rafinesque, which is said to be "silvery with five longitudinal brownish stripes on each side," and have the "head brown above." This description, though erroneous in most respects, is as accurate as Rafinesque's generally are, and agrees sufficiently well with Kirtland's *Labrax multilineatus*, which is doubtless identical with the Cuvieran species. Even such an observer as Rafinesque would have noticed the deep brazen hue of *Morone interrupta*, and would not have overlooked two of the seven very distinct black bands that run along the sides.

Dr. Girard has stated that there are but six branchiostegal rays in his species, but I am able to say, from an examination of the specimens used by Dr. Girard himself, for description, that it agrees with all allied species, in having the normal number of seven, and which are developed as in *Morone americana*.

There are preserved in the Museum of the Smithsonian Institution, three specimens of the *Morone interrupta*, one of which was obtained by Lieutenant Couch, at New Orleans, and two larger ones were found at St. Louis, Missouri, by Dr. George Engelman. The small specimen from New Orleans differs from the two Missouri specimens by the larger second spine of the anal fin, but in every other respect they are similar.